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Mössbauer Isomer Shifts

edited by **G. K. SHENOY,** *Argonne National Laboratory, Argonne, Illinois, U.S.A., and* **F. E. WAGNER,** *Technische Universität München, Garching, Germany.*

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The isomer shift is one of the unique features of Mössbauer spectroscopy. It is of great interest because it embraces the field of nuclear physics, solid state physics and chemistry.

The present volume is the combined effort of specialists in these disciplines to provide a comprehensive discussion of the isomer shift and its uses in studies of the electronic structure of chemical compounds and metallurgical systems, as well as of nuclear structure. The book introduces the reader to the subject of the Mössbauer effect and the isomer shift in considerable detail. The currently available isomer shift data for the known Mössbauer resonances are critically reviewed. The book also deals with the relation between Mössbauer and muonic isomer shifts.

In his foreword to this volume, Professor R.L. Mössbauer expresses the hope that *"it will not only serve as a reference manual for newcomers and experts in the field, but that it may also stimulate new ideas and developments".*

ABBREVIATED CONTENTS: **Foreword** *(R. L. Mössbauer).* **Chapters: 1.** Introduction *(S. Ruby).* **2.** Theory of Isomer Shifts *(G. M. Kalvius and B. D. Dunlap).* **3.** Experimental Techniques *(G. K. Shenoy and F. E. Wagner).* **4.** Theoretical Determination of Electron Densities *(A. J. Freeman and D. Ellis).* **5.** Experimental Determination of Electron Densities *(S. Hüfner, T. K. McNab, P. H. Barrett, H. Micklitz, F. Pleiter, H. de Waard).* **6.** (a) Isomer Shift and Phase Transitions *(R. S. Preston).* (b) Influence of Pressure on Isomer Shifts *(D. L. Williamson).* **7.** Iron and Nickel *(F. v.d. Woude, B. Ingalls and G. A. Sawatzky).* **8.** Mössbauer Shifts in a Selection of Elements and Systems *(F. E. Wagner, U. Zahn, H. D. Bartunik, G. Kaindl and R. L. Cohen).* **9.** (a) Tin Isomer Shifts *(F. A. Flinn).* (b) 5s-5p Elements *(S. L. Ruby and G. K. Shenoy).* **10.** Isomer Shifts in the Rare Earths *(I. Nowik, E. R. Bauminger and G. M. Kalvius).* **11.** Isomer Shifts in the Actinides *(B. D. Dunlap).* **12.** Other Elements: Cs, K, and Kr *(L. E. Campbell).* **13.** Isomer Shifts and Nuclear Models *(W. Henning, J. Speth, P. Kienle and J. Meyer).* **14.** Muonic Isomer Shifts *(H. Backe, E. Kankeleit and H. K. Walter).* **Appendices. References. Subject Index. Author Index.**

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This book consists of a collection of papers contributed by many of Professor Erwin W. Müller's colleagues and friends. It contains the original papers as well as review papers on field electron and field ion emission, and related fields.

Professor Müller's outstanding and varied contributions to Surface Science are well known. He conceived the field emission microscope, an indispensable tool for the study of field emission, surface migration and chemisorption. Extending the experimentally accessible field strength beyond several hundred million volts/cm, he discovered the physical effects of field desorption, field evaporation and field ionization. His invention of the field ion microscope enabled one, for the first time, to see atoms as building blocks of a crystal lattice. By connecting the microscope via a probe-hole to a time-of-flight mass spectrometer, he created a microanalytical tool of ultimate, single atom sensitivity. In 1972 Müller operated the first field desorption microscope, and introduced "time gating" of the field desorption microscope for overall surface analysis.

In discussing the above contributions made by Professor Müller to surface science, the papers in this volume provide a testimony of his prolific and often extraordinary scientific achievements. Surface scientists will welcome the book's publication.

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